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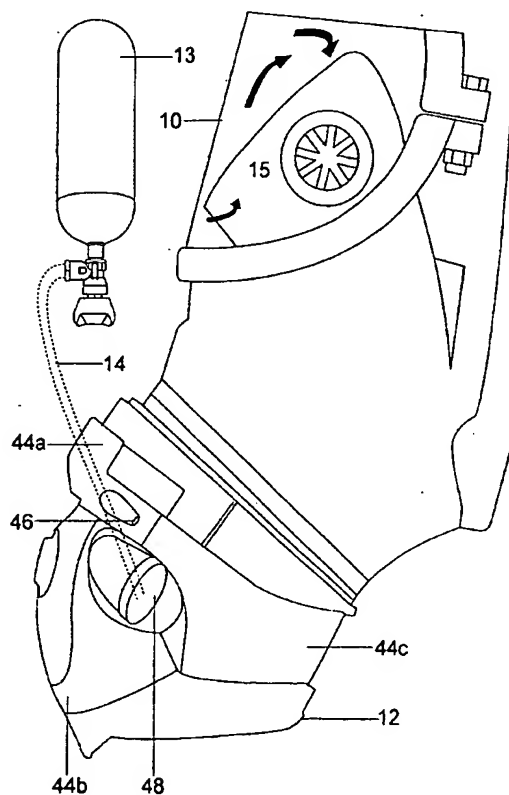
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(54) Title: **BREATHING APPARATUS**



(57) **Abstract:** A face mask (10) mechanically coupled to a lung demand valve (LDV) (12). The face mask (10) comprises a main mask and an inner mask (15) which fits over the wearer's mouth and nose. The interior of the inner mask (15) is in fluidic communication with the interior of the main mask (10) by means of non-return valves (16). The interior of the main mask is in fluidic communication with an inlet port (18) which is mechanically and fluidically coupled to a supply port (20) of an LDV. The LDV (12) includes a diaphragm and a cover (44) which comprises three parts (44a, 44b) and (44c). Exhaled air is used to flush the space around the diaphragm. Thus, any toxic or undesirable gas in the vicinity of the diaphragm is pushed out to atmosphere by the exhaled air flowing past and around the diaphragm.

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ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE,
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A. CLASSIFICATION OF SUBJECT MATTER

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Minimum documentation searched (classification system followed by classification symbols)

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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,X	DE 101 59 219 A (MSA AUER GMBH) 12 June 2003 (2003-06-12) the whole document ---	1-13
X	DE 11 53 258 B (DRAEGERWERK AG) 22 August 1963 (1963-08-22) the whole document ---	1-7, 11-13
X	US 4 356 820 A (TRINKWALDER JR JOSEPH C) 2 November 1982 (1982-11-02) column 3, line 6-11; figure 4 ---	11
A	DE 27 20 681 B (AUERGESELLSCHAFT GMBH) 2 November 1978 (1978-11-02) column 4, line 31-61; figure 3 column 4, line 1-11 --- -/-	8,9



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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 6 394 091 B1 (GIORGINI EUGENE) 28 May 2002 (2002-05-28) column 3, line 58-67 column 4, line 1-6; figure 1 ---	
A	US 4 819 626 A (HIMMENS IAN A) 11 April 1989 (1989-04-11) abstract; figures 1,2 -----	

INTERNATIONAL SEARCH REPORT

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Patent document cited in search report		Publication date	Patent family member(s)	Publication date
DE 10159219	A	12-06-2003	DE 10159219 A1 WO 03047698 A1	12-06-2003 12-06-2003
DE 1153258	B	22-08-1963	NONE	
US 4356820	A	02-11-1982	NONE	
DE 2720681	B	02-11-1978	DE 2720681 B1	02-11-1978
US 6394091	B1	28-05-2002	AU 3374397 A CA 2255040 A1 GB 2329591 A ,B WO 9746281 A1	05-01-1998 11-12-1997 31-03-1999 11-12-1997
US 4819626	A	11-04-1989	GB 2197795 A ,B	02-06-1988